The Micrographic Dictionary—Pollen Grains

I READ your criticism of this book in last number of NATURE with a good deal of interest, and I fully agree with your reviewer in his statement that "workers in different fields will place a different estimate on the importance of their own department." Allow me to call your attention to the two singularly erroneous figures of the pollen grains of *Mimulus moschatus* (Pl. 32, Fig. 24) in this work. I have frequently examined the pollen of this plant, and have never seen it anything like the figures in the "Dictionary," or in any way differing from the grains of many other members of the Scrophulariaceæ. The pollen of *M. moschatus* is like a grain of wheat, and not like the wonderful convolute ball shown in the "Dictionary."

In his "Common Objects for the Microscope," Plate 3, Fig. 21, the Rev. J. G. Wood reproduces the *first* of these two extraordinary figures, and describes the pollen as "belted with wide and deep bands," &c., but by an oversight he omits to give the source from which the erroneous figure is copied.

In his "One Thousand Objects for the Microscope," Plate 2, Fig. 6, Mr. Cooke copies the *second* extraordinary figure of this pollen, and says, "these curious granules resemble a band or cord rolled or folded in a spherical mass," as if he had so seen them. The "Dictionary" plate certainly does look like this, but in the letter-press the folds are referred to as "slits or furrows." By an oversight Mr. Cooke also omits to give the source from which *his* erroneous figure is copied.

W. G. SMITH

The Phylloxera

IN the report to the Department of the Interior of the Canton of Geneva by the commission appointed to inquire into the best means of stopping the ravages of Phylloxera, which I have just received from Prof. Forel, of Morges, it is stated that the insect was most probably introduced from England in some vines which were taken to Geneva to certain graperies of Baron Rothschild in 1869. These graperies are in the middle of the infected district—they were found to be infected within twelve months of the arrival of the plants, and no vineyards but those in the neighbourhood of these graperies have been infected in all Switzerland. Prof. Forel, in his letter to me, says that while the surrounding vines have perished, those attacked in Baron Rothschild's houses have suffered very little indeed, and bear plenty of fruit. These vines, he says, are Black Hamburgh and Muscat d'Alexandrie or d'Alicante. He asks if in England anything is known which points out any kind of vine as suffering less than other kinds. Can any of your readers tell me anything about it?

Clifton, Jan. 23 G. H. WOLLASTON

Thermometer Scales

I SHALL feel greatly obliged if any reader of NATURE can inform me what scale the thermometer referred to in the following extracts was made to:—"7 Feb., 1775. This day the thermometer was down to 80, two hours after sunrise." "This thermometer has five inches divided into 75 degrees above temperate (*sic*); and $6\frac{3}{8}$ inches below temperate, divided into 100 degrees; the spirit at 80 was about an inch from the bottom. In the frost in 1739 the spirit sunk below all the marks in this thermometer." Also—"Dec. 30, 1739. Thermometer sunk below all the marks. . . . This thermo was marked down to 7 below Fahrenheit's freezing point of 32; so this was below 25 of Fahr." Some very hot days in July 1757 are marked (I presume by the same thermometer) at 40, 41, 46, and 47 degrees; another day, "very near 50" is spoken of as the hottest day the writer thinks he ever remembers in England, "except the famous hot Saturday on the 11th of June, 1748."

In 1783-4, 13 below 0 of *Linnæus* is mentioned as very severe cold. The scale of Linnæus is mentioned several times. I have failed to discover the scale of the first thermometer, and never heard of that of Linnæus. If any of your readers can enlighten me as to the relation of these scales to that of Fahrenheit or Réaumur, I shall feel greatly indebted.

Norwich, Feb. 1 THOMAS SOUTHWELL

OUR ASTRONOMICAL COLUMN

THE NEXT RETURN OF HALLEY'S COMET.—In the year 1864 the late Count G. de Pontécoulant made an important communication to the Paris Academy of Sciences relating to the perturbations of this famous comet. He remarked at the outset: "I propose, in my new researches on the comet of Halley, to follow the course of that body from the epoch when it was observed for the first time in a manner sufficiently precise to allow of determining the orbit, until that of its next return to perihelion, which will take place in 1910, *i.e.* during an interval of nearly three hundred and eighty years, including five entire revolutions of the comet. I shall describe here, as succinctly as it is possible to do, the results of the immense calculations which it has been necessary to effect in order to attain this object." We shall confine ourselves in the present remarks to a few particulars relating to the appearance of the comet in 1910, reserving a further account of Pontécoulant's memoir for a future occasion. It is, however, impossible to avoid an expression of regret that the astronomer who has completed the enormous work indicated in the above extract, should have passed away without (so far as we know) putting upon record the successive steps of his calculations in sufficient detail to be of service to the future investigator, and it is to be hoped his papers may yet be made available for this purpose. Mere statements of final results, necessitating for their attainment such a prodigious amount of labour and such unusual skill, are hardly all that is required, though in this remark we imply no want of confidence in the accuracy of the work performed. It is almost certain that the perturbations of Halley's comet will be recomputed before the year of its next return, and it is as certain that the possession in detail of the various numerical results of Pontécoulant's work would be of very great service to anyone who may undertake its verification, not only by way of check as he proceeds, but as a guide to the effective management of the formidable mass of figures involved.

The perihelion passage in 1835 is fixed to Nov. 15·95 Paris mean time, at which moment the comet is found to have been moving in an ellipse with a period of 27895·81 days. The influence of the planet Jupiter upon the length of the present revolution is greater than in any of the four previous ones, and amounts to 679·37 days, by which the next perihelion passage is accelerated. Saturn retards the comet 2·79 days, while Uranus accelerates it 2·30 days, therefore nearly negativing the influence of Saturn. The attraction of other planets is neglected. The total effect of perturbation during the actual revolution is thus found to be 678·88 days, the period being shortened thereby; and hence the time of revolution corresponding to 1835, Nov. 16, is diminished to 27216·93 days, and the next perihelion passage is consequently fixed to 1910, May, 23·87 Paris time, the comet then completing the shortest revolution since 1531, the preceding revolution having been the longest, and their difference is upwards of two years. The periodic time corresponding to the comet's motion at perihelion in 1910 is 27,790 days. A notable change is produced by the action of the planet Jupiter in the perihelion distance, which is increased by upwards of a tenth of the earth's mean distance from the sun, and the comet's orbit is thus brought into very close proximity to that of the earth at the descending node. In 1835 the comet at this point passed 0·1511 from our track; in 1910, according to Pontécoulant, it will be distant only 0·0157. The excentricity of the orbit in 1910 is found to be 0·9617332; the semi-axis major, 17·95546; the longitude of perihelion, 305° 38′ 14″; the ascending node, 57° 10′ 33″; inclination, 17° 46′ 51″; the motion is retrograde. The longitudes are counted from the mean equinox at perihelion.

The track of the comet calculated from these elements is a very favourable one for observation. At the end of October 1909 the comet has the same theoretical intensity of light as when it was last glimpsed by Dr. Lamont with the Munich refractor, on the 17th of May, 1836. (It is often erroneously supposed that the last observations

were made at the Cape of Good Hope.) Its position, according to the above data, is in the neighbourhood of 130 Tauri. Thence retrograding with a slow southerly motion in declination, it passes through the constellation Aries, in January 1910, and is situate in Pisces until it has approached our globe within the mean distance of the earth from the sun, or until about the beginning of the last week in May. Its apparent motion then rapidly accelerates. On June 12 the calculated position is close to the bright star Capella, and, five days later, on the confines of Lynx and Leo Minor. At this period the comet attains its least distance from the earth, which may be taken as 0·25. Descending pretty quickly towards the equator, we find it in the neighbourhood of 84 Leonis at the beginning of July, afterwards gradually losing itself in the evening twilight. With the date for perihelion passage assigned by Pontécoulant, the comet would be most conspicuous in the first half of the month of June, in the absence of the moon, which is full on the 22nd.

ENCKE'S COMET has been detected very close upon the calculated position at more than one of the private observatories in this country, but up to the interference of moonlight it was extremely faint. We shall continue the ephemeris next week.

ANTARES.—The measures of this star communicated last week by Mr. J. M. Wilson, of Rugby, are pretty conclusive as to a physical connection of the components. If the angle and distance used as a starting-point (1848) in our former notice be brought up to Mr. Wilson's epoch, 1873·42, by applying Leverrier's proper motions in the interval to the place of the large star, we have

Angle . . . 287°·8. Distance . . . 3″·53.

The observation gives the angle 268°·6 (differing 19°) less than any yet assigned by previous measures; but in 1845, Mitchel thought the small star was on the parallel preceding, and all subsequent observations except the one in question have placed the companion in the *n.p.* quadrant, Dawes in 1864 finding the angle nearly 276°.

LALANDE'S ÉTOILE SINGULIÈRE.—On the 4th of March, 1796 ("Histoire Céleste," p. 211), Lalande observed meridionally a star of 6·7 magnitude, the position of which for the beginning of the present year is in R.A. 8h. 13m. 3s., N.P.D. 68° 51′·5; on the 15th of the same month he again observed the star, and the resulting places for 1800 belong to Nos. 16292-3 of the reduced catalogue. On March 4 he attaches this remark to his observation—"Étoile singulière." The observation of the 15th is without note. We have examined this star telescopically on several occasions, without being able to detect any unusual appearance about it. The light is yellowish. Has any reader of NATURE had the curiosity to look at it? The remark is a strange one for the observer of so many thousands of stars to attach, unless there was really something singular in the star's aspect at the time.

NEWS FROM THE "CHALLENGER"*

THE *Challenger* left Port Nicholson on the 7th July, 1874, and proceeded under sail along the east coast of New Zealand. On the 8th we rounded and trawled in 1,100 fathoms, lat. 40° 13′ S., long. 177° 43′ E., with a bottom-temperature of 2° C., and a bottom of soft greenish ooze. Many animals were brought up by this trawl, resembling closely those which we had taken at a corresponding depth in other portions of the Southern Sea. On the 10th we again trawled and sounded in 700 fathoms about forty miles to the east of East Cape.

We then continued our course northwards towards the Kermadec Islands, and on the 14th we took our usual series of observations midway between Macaulay and Raoul Islands in the Kermadec group. At this station we trawled at a depth of 630 fathoms; and we were greatly struck with the general resemblance between the assemblage of animal forms brought up in the trawl and the results of a good haul in about the same depth off the coast of Portugal or North Africa. Among the more interesting objects were a very large and splendid specimen of a Hexactinellid sponge allied to *Poliopogon*, several other fine sponges referred to the same group, and three or four examples of two species of *Pentacrinus* new to science, resembling generally *P. asteria*, L., from the Antilles. We trawled on the following day in 600 fathoms, forty-five miles to the north of Raoul Island, with nearly equal success. On the evening of Sunday the 19th we arrived at Tongatabu and called on the principal missionary, Mr. Baker, from whom we received every possible attention during our short stay. After spending two days in visiting different parts of the island, we left Tongatabu on the 22nd of July, and after taking a few hauls of the dredge in shallow water we proceeded towards Kandavu in the Fijis. On the 24th we stopped off Matuku Island and landed a party of surveyors and naturalists; and while they were taking observations and exploring on shore we trawled in 300 fathoms, and received among other things a fine specimen of the pearly Nautilus, *Nautilus pompilius*, which we kept living in a tub for some time in order to observe its movements and attitudes.

On Saturday the 25th of July we arrived at Kandavu, on the 28th we went to Levuka, and we returned to Kandavu on the 3rd of August, where we remained until the 10th.

At Fiji the civilian staff were occupied in examining the reefs and generally in observing the natural history of the islands; and in this we received all friendly assistance from H.M. Consul, Mr. Layard, and from Mr. Thurston, Minister of King Cacobau. During our stay, a mixed party of naval and civilian officers went in the ship's barge to Mbaw and visited the king.

Between New Zealand and the Fiji group only two soundings were taken to a greater depth than 1,000 fathoms. Of these, one at a depth of 1,100 off Cape Turnagain, New Zealand, gave a bottom of grey ooze, and a bottom-temperature of 2° C.; and the second at 2,900 fathoms, lat. 25° 5′ S., long. 172° 56′ W., midway between the Kermadecs and the Friendly Islands, gave "red clay," and a temperature of 0°·5 C. Four serial temperature-soundings were taken; and the distribution of temperature was found to correspond in its main features with what we had previously met with in oceans communicating freely with the Antarctic Sea.

The dredgings, which, with the exception of one near the New Zealand coast, were all at depths varying from three to six hundred fathoms, yielded a great number of very interesting forms; but, as I have already remarked, they tended to confirm our impression that even at these comparatively moderate depths, at all depths, in fact, much greater than a hundred fathoms, while species differ in different localities, and different generic types are from time to time introduced, the general character of the fauna is everywhere very much the same.

On the 10th of August we left Kandavu and proceeded towards Api, one of the least known of the New Hebrides, where there is as yet no permanent missionary station. On the 12th we sounded and trawled in 1,350 fathoms, with a bottom of reddish ooze; we sounded again on the 15th in 1,450 fathoms with red clay; and on the 18th, after passing through the channel between Makuru and Two-Hill Islands, we stopped off Api in twenty-five fathoms, close to the edge of the reef and opposite a landing-place.

In order to receive, as far as we could, the good-will of

* "Report on the Cruise of H.M.S. *Challenger*, from July to November 1874," by Prof. Wyville Thomson, F.R.S., Director of the Civilian Scientific Staff. A paper, dated H.M.S. *Challenger*, Hong Kong, read before the Royal Society, Feb. 4.